

What Is Claimed Is:

1. A polypeptide that comprises at least three beta-sheet/beta-turn structures and that is not a naturally occurring fibrous protein.

2. The polypeptide of claim 1, wherein each of the beta-sheet structures comprises from 3 to about 7 amino acid residues.

3. The polypeptide of claim 2, wherein each of the beta-sheet structures comprises from about 5 to about 7 amino acid residues.

4. The polypeptide of claim 1, further comprising at least one amino acid residue capable of participating in cross-linking.

5. The polypeptide of claim 1, wherein the polypeptide consists essentially of a portion of the amino acid sequence set forth in Figure 1B.

6. The polypeptide of claim 5, wherein the polypeptide comprises an amino acid sequence selected from the group consisting of amino acid residues 374-499, 19-160, 188-367 and 607-717, respectively, of Figure 1B.

7. The polypeptide of claim 5, wherein the portion of the amino acid sequence set forth in Figure 1B is modified by the addition, deletion or substitution of from 1 to about 10 amino acid residues.

8. The polypeptide of claim 5, wherein the polypeptide comprises tandem repeats of a portion of the amino acid sequence set forth in Figure 1B.

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9. The polypeptide of claim 8, wherein the polypeptide consists essentially of the amino acid sequence set forth in Figure 4C.

10. The polypeptide of claim 8, wherein the polypeptide consists essentially of the amino acid sequence set forth in Figure 4C, modified by the addition, deletion or substitution of from 1 to about 10 amino acid residues.

11. A prosthesis comprising an animal material, wherein a surface of the animal material is coated with a polypeptide according to claim 5.

12. A prosthesis comprising a synthetic material, wherein a surface of the synthetic material is coated with a polypeptide according to claim 5.

13. A prosthesis comprising a metal, wherein a surface of the metal is coated with a polypeptide according to claim 5.

14. Material suitable for implantation into humans, wherein the material consists essentially of a polypeptide according to claim 5.

15. The material of claim 14, wherein the material is selected from the groups consisting of materials for blood vessel replacement, materials for heart valve replacement, materials for covering burns, materials for covering wounds, and stents.

16. A cosmetic material comprising the polypeptide of claim 5.

17. An elastic material comprising the polypeptide of claim 1.

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18. A high tensile-strength material comprising the polypeptide of claim 1.

19. The polypeptide of claim 1, wherein the polypeptide consists essentially of a portion of the amino acid sequence of an animal elastin.

20. The polypeptide of claim 1, wherein the polypeptide consists essentially of a portion of the amino acid sequence of lamprin.

21. The polypeptide of claim 1, wherein the polypeptide consists essentially of a portion of the amino acid sequence of a spider silk protein.

22. A material comprising two or more polypeptides selected from the group consisting of:

(A) a polypeptide consisting essentially of a portion of the amino acid sequence set forth in Figure 1B comprising at least three beta-sheet/beta-turn structures;

(B) a polypeptide consisting essentially of a portion of the amino acid sequence of an animal elastin comprising at least three beta-sheet/beta-turn structures;

(C) a polypeptide consisting essentially of a portion of the amino acid sequence of lamprin comprising at least three beta-sheet/beta-turn structures; and

(D) a polypeptide consisting essentially of a portion of the amino acid sequence of a spider silk protein comprising at least three beta-sheet/beta-turn structures,

wherein the two or more polypeptides may be the same or different.

23. The material of claim 22, wherein the material comprises a mixture of the two or more polypeptides.

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24. The material of claim 22, wherein the material comprises a fusion protein comprising the two or more polypeptides.

25. The material of claim 22, wherein the two or more polypeptides are chemically linked together.

26. A polypeptide having the primary structure of a portion of a naturally occurring fibrous protein and a secondary structure comprising at least three beta-sheet/beta-turn structures, wherein

(A) each of the beta-sheet/beta-turn structures comprises from 3 to about 7 amino acid residues and (B) the polypeptide is not a naturally occurring fibrous protein.

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